

Chapter 2

LITERATURE REVIEW

2.1. INDUSTRY

2.1.1. DEFINITION - INDUSTRY

As per Industrial Disputes Act, 1947 of Andaman & Nicobar Administration (2009) "Industry" means any systematic activity carried on by co-operation between an employer and his workmen (whether such workmen are employed by such employer directly or by or through any agency, including a contractor) for the production, supply or distribution of goods or services with a view to satisfy human wants or wishes (not being wants or wishes which are merely spiritual or religious in nature), whether or not;

- i. any capital has been invested for the purpose of carrying on such activity; or
- ii. such activity is carried on with a motive to make any gain or profit



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2.1.2. SHIPBUILDING INDUSTRY

As per the statistics available with Department of Census & Statistics - Sri Lanka (2008) shipbuilding and repairing industry in Sri Lanka was not considered as a major industry when the local manufacturing industries are considered. The total number of establishments engaged in local shipbuilding & ship repairing by 2008 was 31, which included 3,149 employees. Building and repairing of pleasure & sporting boats had only 05 establishments with 2,485 employees. However, the total value of the output from both sectors was Rs. 12,834 Millions.

CDPLC Annual Report (2007) showed that, in the local industry, Colombo Dockyard PLC is the leader in both shipbuilding & ship repair sectors. With the Japanese management policies, Colombo Dockyard has set their strategic management plan for three year period expecting to exceed Rs. 10 Bn at an exchange rate of US\$ 1: SL Rs. 110 at 2010. In 2007, Colombo Dockyard PLC recorded a net profit of Rs. 1,082 Mn, a 78% growth over last year's recorded net profit.

A major new in-depth report from Ocean Shipping Consultants Ltd, U.K. (2001) confirms the fears of many in the shipbuilding industry of a forthcoming major downturn in new vessel construction levels. The downturn is expected to hit particularly hard due to the high volumes of the current world order book, which funds newbuilding volumes not seen since the shipbuilding boom years of the mid 1970s. In essence, the shipbuilding industry faces very difficult market conditions, where yard survival will be, in many cases, contingent on yard concentration on the vessel designs in most demand for ship owners. For ship owners, whilst low prices are set to prevail throughout much of the forward period, the timing of the placing of newbuilding orders will remain crucial in determining vessel ownership and operation profitability.

2.2. ENVIRONMENTAL ANALYSIS

Pearce and Robinson (2007) pointed out that a firm's external environment consists of three interrelated sets of factors that play a principal role in determining the opportunities, threats and constraint that the firm faces. The remote environment comprises factors originating beyond, and usually irrespective of any single firm's operating situation-economic, social, political, technological, and ecological factors. Factors that more directly influences a firm's prospects originate in the environment of its industry, including entry barriers, competitor rivalry, the availability of substitutes, and the bargaining power of buyers and suppliers.

Also the operating environment comprises factors that influence a firm's immediate competitive situation-competitive position, customer profile, suppliers, creditors and the labour market. These three set of factors provide many of the challenges that a particular firms faces in its attempt to attract or acquire need resources and to profitably market its goods and services. Environment assessment is more complicated for multinational corporations (MNC's) than for domestic firms because multinationals must evaluate several environments simultaneously (Pearce and Robinson, 2007).

2.2.1. GLOBAL SHIPBUILDING DEMAND & SUPPLY

The price of shipbuilding and the stability of the industry depend on many factors (refer to Figure 2-1) as per a report on shipbuilding industry published in 2003 by Marine International Limited (2003).

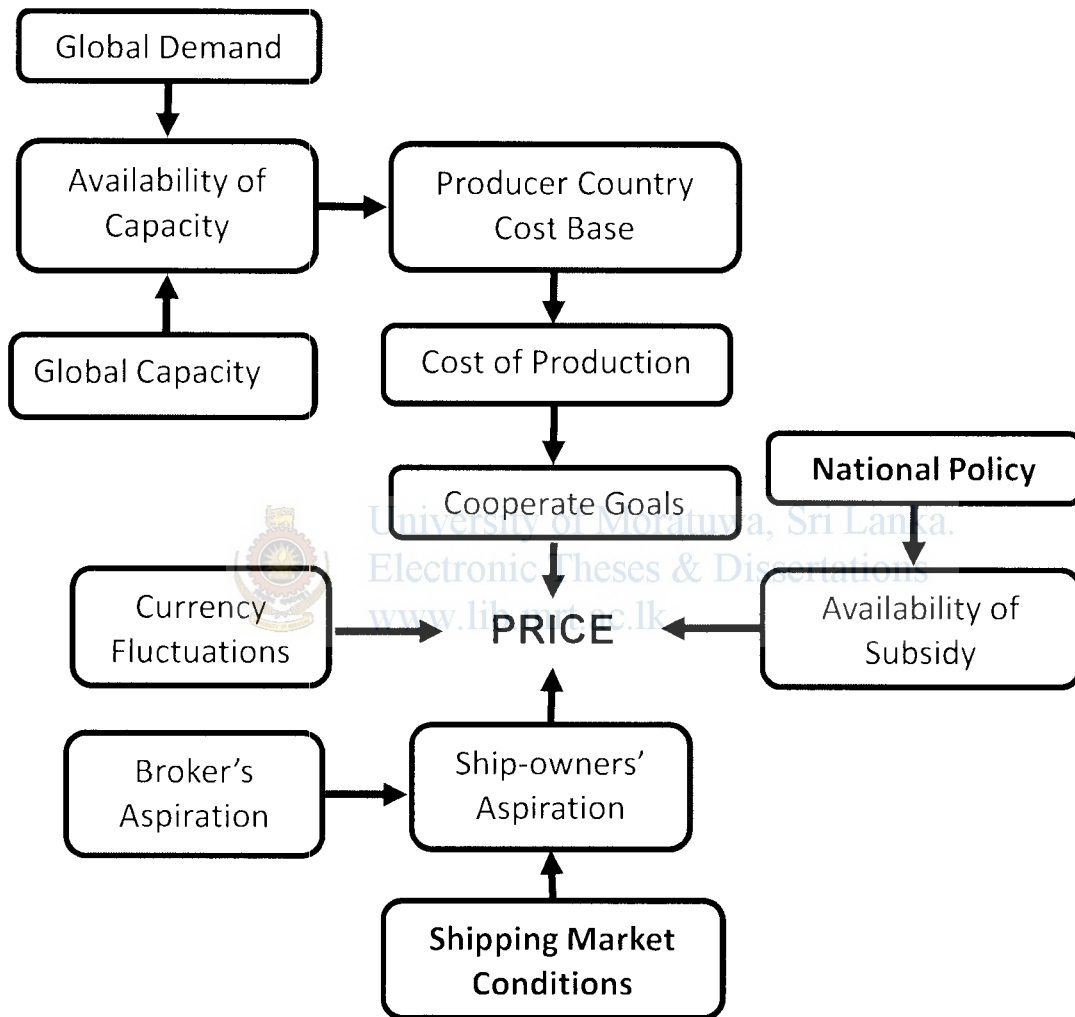


Figure 2-1 – Elements of price determination in shipbuilding

The Managing Director / CEO of Colombo Dockyard says that even though the Sri Lanka's economy does not have much impact on the industry as a whole, the global shipping industry is influenced immensely on the demand and availability of ship repair services and shipbuilding yards in the region (Colombo Dockyard PLC, 2007).

As per the Korea Shipbuilders' Association (2008) with its share of the world's shipbuilding market on the rise and in line with the new national policy to expand global cooperation in all fields, Korea joined the Organisation for Economic Co-operation and Development, France (OECD) in Oct. 1990, its first official forum with advanced countries. The Korean shipbuilding industry reached a new milestone, becoming number one in the world in terms of new shipbuilding order receipts with a 37.8% share. Despite these successes, hardships beset the industry in the wake of the Asian financial crisis in 1997. However, with its high level of experience, technology and management capability, the domestic shipbuilding sector quickly recovered and in fact increased its competitiveness through corporate restructuring and reorganisation.

1.2. INDUSTRY FORCES

Michael Porter provided a framework that models an industry as being influenced by five forces. The strategic business manager seeking to develop an edge over rival firms can use this model to better understand the industry context in which the firm operates. (QuickMBA, 2007).



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Mahinda (2007) in his MBA research on "*Analysis of Competitive Advantage of the Sri Lankan Construction Chemical Industry: A Case Study*", points out that the performance of the industry forces depends on several factors for the particular industry.

When a firm sustains profits that exceed the average for its industry, the firm is said to possess a competitive advantage over its rivals. The goal of much of business strategy is to achieve a sustainable competitive advantage (QuickMBA, 2007).

Porter (1985) identified two basic types of competitive advantage:

- Cost advantage
- Differentiation advantage

A competitive advantage exists when the firm is able to deliver the same benefits as competitors but at a lower cost (cost advantage), or deliver benefits that exceed those of competing products (differentiation advantage). Cost and differentiation advantages are

known as positional advantages since they describe the firm's position in the industry as a leader in either cost or differentiation.

In pursuing an advantage over its rivals, a firm can choose from several competitive moves as Porter *ibid.* pointed put:

- Changing prices - raising or lowering prices to gain a temporary advantage.
- Improving product differentiation - improving features, implementing innovations in the manufacturing process and in the product itself.
- Creatively using channels of distribution - using vertical integration or using a distribution channel that is novel to the industry.
- Exploiting relationships with suppliers.

BCG founder Bruce Henderson generalized this observation as the Rule of Three and Four: a stable market will not have more than three significant competitors, and the largest competitor will have no more than four times the market share of the smallest. If this rule is true, it implies that (QuickMBA, 2007):

- If there is a larger number of competitors, a shakeout is inevitable
- Surviving rivals will have to grow faster than the market
- Eventual losers will have a negative cash flow if they attempt to grow
- All except the two largest rivals will be losers
- The definition of what constitutes the “market” is strategically important.

2.3. VALUE CHAIN ANALYSIS

Ministry of Knowledge Economy - Korea (2008), under the directive of the Korean government, carried out a research to identify the major areas of the Korean Shipbuilding industry which were analysed using value chain. The existing value chain and the position of Korean industry with respect to world-class standards were identified as illustrated in Figure 2-3:



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| AREA | VALUE CHAIN | LEVEL | RATIONALE |
|-------------------------|---------------|-------|--|
| Work Force | Design | 5 | • Strong design experts |
| | Manufacturing | 4 | • Superb manufacturing and mgt. skills • Moderate labour costs |
| Technology | R & D | 4 | • Outstanding design & product dev. capacity |
| | Manufacturing | 4 | • Excellent manufacturing technology |
| Related Industries | Upstream | 3 | • World-class steel industry • Excellent engines, but weak in equipment |
| | Downstream | 3 | • Weak shipping industry • Weak financing environment |
| Internal Infrastructure | Facilities | 5 | • Latest facilities thanks to bold investment |
| | IT | 4 | • Design automation including 3D, CAD |

1 2 3 4 5
WORLD CLASS

Figure 2-2 – Current status of Korean shipbuilding
 Source: Ministry of Knowledge Economy - Korea (2008)

As per Porter (1985), to better understand the activities through which a firm develops a competitive advantage and creates shareholder value, it is useful to separate the business system into a series of value-generating activities referred to as the value chain. He introduced a generic value chain model that comprises a sequence of activities found to be common to a wide range of firms.

Since technology is employed to some degree in every value creating activity, changes in technology can impact competitive advantage by incrementally changing the activities themselves or by making possible new configurations of the value chain (NetMBA.com, 2007).

2.4. STRATEGIES

4.1. INTRODUCTION

Porter (1996) argued that operational effectiveness, although necessary to superior performance, is not sufficient, because its techniques are easy to imitate. In contrast, the essence of strategy is choosing a unique and valuable position rooted in systems of activities that are much more difficult to match.

He further indicated that today's dynamic markets and technologies have called into question the *sustainability of competitive advantage*. Under pressure to improve productivity, quality and speed, managers have embraced tools such as TQM, benchmarking, and reengineering. Dramatic operational improvements have resulted, but rarely have these gains translated into *sustainable profitability*. And gradually, the tools have taken the place of strategy. As managers push to improve on all fronts, they move further away from viable competitive positions.

4.2. GENERIC STRATEGIES

A firm positions itself by leveraging its strengths. Porter *ibid.* has argued that a firm's strengths ultimately fall into one of two headings: cost advantage and differentiation. By applying these strengths in either a broad or narrow scope, three generic strategies result: cost leadership, differentiation, and focus. These strategies are applied at the business unit level. They are called generic strategies because they are not firm or industry dependent.

QuickMBA (2007) explained that the firms that succeed in cost leadership often have the following internal strengths:



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- Access to the capital required to make a significant investment in production assets: this investment represents a barrier to entry that many firms may not overcome.
- Skill in designing products for efficient manufacturing, for example, having a small component count to shorten the assembly process.
- High level of expertise in manufacturing process engineering.
- Efficient distribution channels.

Firms that succeed in a differentiation strategy often have the following internal strengths;

- Access to leading scientific research.
- Highly skilled and creative product development team.
- Strong sales team with the ability to successfully communicate the perceived strengths of the product.
- Corporate reputation for quality and innovation.

It is further indicated therein that these generic strategies are not necessarily compatible with one another. If a firm attempts to achieve an advantage on all fronts, in this attempt it may achieve no advantage at all. For example, if a firm differentiates itself by supplying very high quality products, it risks undermining that quality if it seeks to become a cost leader. Even if the quality did not suffer, the firm would risk projecting a confusing.

For this reason, Porter *ibid.* argued that to be successful over the long-term, a firm must select only one of these three generic strategies. Otherwise, with more than one single generic strategy the firm will be “stuck in the middle” and will not achieve a competitive advantage.

Also he pointed out that firms that are able to succeed at multiple strategies often do so by creating separate business units for each strategy. By separating the strategies into different units having different policies and even different cultures, a corporation is less likely to become “stuck in the middle”.

However, there exists a viewpoint that a single generic strategy is not always best because within the same product customers often seek multi-dimensional satisfactions such as a combination of quality, style, convenience and price. There have been cases in which high quality producers faithfully followed a single strategy and then suffered greatly when another firm entered the market with a lower-quality product that better met the overall needs of the customers (QuickMBA, 2007).

2.5. NATIONAL POLICIES

As per the data available with National Science and Technology Commission (2008) Sri Lanka was not having a national policy for Science and Technology (S&T), specially related to shipbuilding industry. Hence, National Science and Technology Commission were drafting a policy to cover the overall spectrum of science and technology and the same was available for comments by the general public. Some of the proposed policy elements were:

- Develop, select, acquire and adapt scientific knowledge and technology necessary for the progressive modernization of all sectors so as to enhance the country's competitiveness in the world economy.
- Foster scientific and technological activities in all relevant fields and encourage the development of self-reliance in scientific and technological capability.
- Ensure quality standards of all products and services to face the challenges of competitive global markets.
- Ensure sustainable development while conserving the natural resources of the country and protecting the environment, through the appropriate use of Science and Technology.

Department of Science and Technology - India (2003) highlighted that India developed their Science and Technology policy in year 2003 to achieve several objectives, especially to develop technological infrastructure and R&D.



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2.6. SUSTAINABILITY

2.6.1. DEFINITION OF SUSTAINABILITY

Sustainability, in a broad sense, is the capacity to endure. Also Brundtland Commission 1987 explained sustainability “*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of “needs”, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs*”.

Efforts to live more sustainably can take many forms from reorganising living conditions (e.g., ecovillages, eco-municipalities and sustainable cities), reappraising *economic sectors* (green building, sustainable agriculture), or work practices (sustainable architecture), using *science to develop new technologies* (green technologies, renewable energy) to adjustments in individual lifestyles.

2.6.2. ASSESSING SUSTAINABILITY

The dimensions of sustainability are often taken to be: environmental, social and economic, known as the “three pillars” as stipulated in the United Nations General Assembly (2005). These can be depicted as three overlapping circles (or ellipses), to show that they are not mutually exclusive and can be mutually reinforcing as illustrated in Figure 2-3.

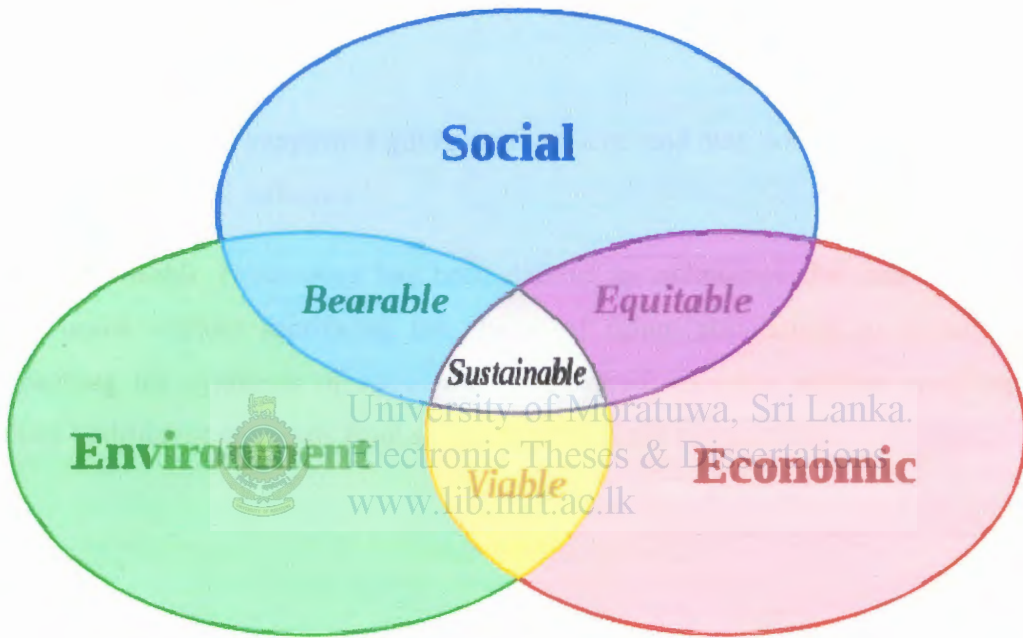


Figure 2-3 – Cooperative intersection of the social, environmental and economic pillars of sustainability

The sustainability of a certain technology could be assessed using the following indices as per research work of Prof. Dunmade (2002);

1. TECHNICAL

- 1.1. Accessibility of parts
- 1.2. Availability of servicing infrastructure
- 1.3. Availability of technical know-how
- 1.4. Time between repairs

2. ENVIRONMENTAL SUSTAINABILITY

- 2.1. Resource consumption
- 2.2. Environmental releases

2.3. Resource conservation

2.4. Compliance with environmental standards

3. ECONOMIC SUSTAINABILITY

3.1. Affordability

3.2. Reusability

3.3. Local availability of servicing resources

4. SOCIO-POLITICAL SUSTAINABILITY

4.1. Level of awareness

4.2. Acceptability

4.3. Availability of supportive government policies and their continuity

4.4. Socio-cultural influence

There, *Sustainable Technology* has been defined as technology that provides for our current needs without sacrificing the ability of future populations to sustain them. Approaching the synthesis of sustainably engineered solutions requires weighing the qualities of different proposals from a variety of different perspectives.



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